

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
2 December 2004 (02.12.2004)

PCT

(10) International Publication Number
WO 2004/103145 A3

(51) International Patent Classification⁷: G01T 1/16,
A61N 5/10

(21) International Application Number:
PCT/SE2004/000781

(22) International Filing Date: 21 May 2004 (21.05.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0301508-8 23 May 2003 (23.05.2003) SE
60/472,773 23 May 2003 (23.05.2003) US

(71) Applicant and

(72) Inventor: NILSSON, Görgen [SE/SE]; Gryningsvägen
47, S-743 32 VRETA (SE).

(74) Agent: DR LUDWIG BRANN PATENTBYRÅ AB; PO
Box 171 92, S-104 62 Stockholm (SE).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

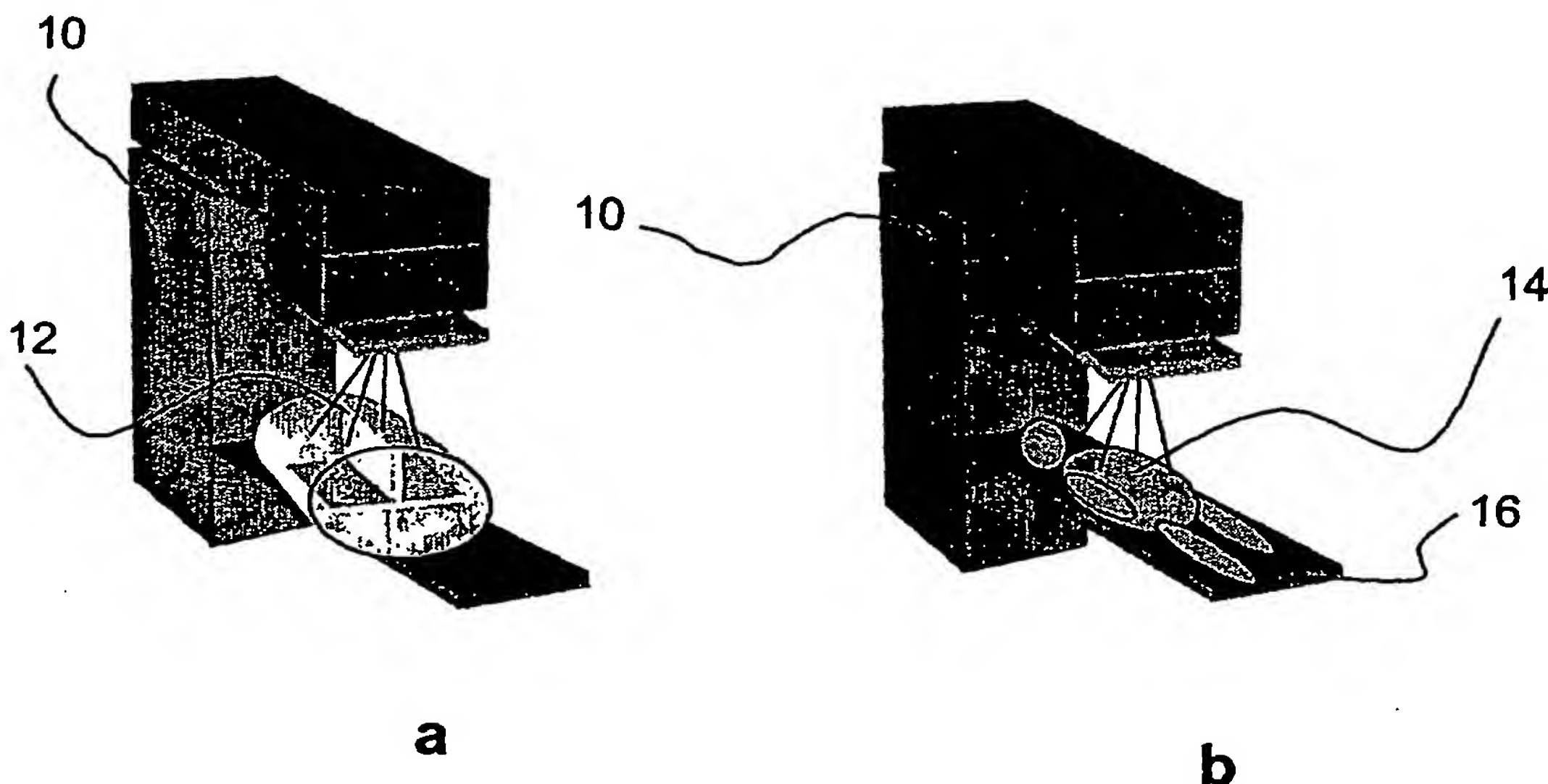
Published:

— with international search report

(88) Date of publication of the international search report:
17 February 2005

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR PRE TREATMENT VERIFICATION IN RADIATION THERAPY



(57) Abstract: The present invention relates to a method to measure dose distribution in a patient-shaped phantom with high accuracy. The invention consists of a method of measuring dose distribution in a phantom for radiation therapy treatment verification, a detector configuration in such a phantom, detector improvement and measurement methodology to enable application of correction factors in an accurate way.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 2004/000781

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G01T 1/16, A61N 5/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G01T, A61N, A61B, K61N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5511107 A (SLISKI, A P), 23 April 1996 (23.04.1996), column 1 - column 2, figure 2 --	1-9,17
Y	AGAZARYAN, N ET AL: THREE-DIMENSIONAL VERIFICATION FOR DYNAMIC MULTILEAF COLLIMATED IMRT. Proceedings of the 22nd Annual EMBS Int Conf, July 23-28, 2000, Chicago IL. See abstract and section "I.Material and Methods." --	1-9,17
A	JURSINIC, P A ET AL: A 2-D DIODE ARRAY AND ANALYSIS SOFTWARE FOR VERIFICATION OF INTENSITY MODULATED RADIATION THERAPY DELIVERY. Publ 22 April 2003. Med.Phys. 30(5). See abstract --	1-9,17

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

19 October 2004

Date of mailing of the international search report

29-10-2004

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

MARKUS STALÖ /ELY
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 2004/000781

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>BJÖRK, P ET AL: COMPARATIVE DOSIMETRY OF DIODE AND DIAMOND DETECTORS IN ELECTRON BEAMS FOR INTRAOPERATIVE RADIATION THERAPY. Publ 15 August 2000. Med.Phys. 27(11), November 2000. See abstract and section "III.Results and Discussion"</p> <p>--</p>	1,6-8,17
A	<p>CHUANG, C ET AL: INVESTIGATION OF THE USE OF MOSFET FOR CLINICAL IMRT DOSIMETRIC VERIFICATION. Publ 22 March 2002. Med.Phys. 29 (6), June 2002. See sections "Angular dependence" and "Depth dose dependence"</p> <p>--</p>	1,6-8,17
A	<p>SHI, J ET AL: IMPORTANT ISSUES REGARDING DIODE PERFORMANCE IN RADIATION THERAPY APPLICATIONS. Proceedings of the 22nd Annual EMBS Int Conf, July 23-28, 2000, Chicago IL. See abstract and chapters 2 and 3</p> <p>--</p>	6-8,17
A	<p>SOARES, C G ET AL: DOSIMETRY OF BETA-RAY OPHTALMIC APPLICATORS: COMPARISON OF DIFFERENT MEASUREMENT METHODS. Publ 31 January 2001. Med.Phys. 28(7), July 2001. See for example abstract and Table II</p> <p>-- -----</p>	1-9,17

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 2004/000781

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See extra sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: **1-9 and 17**

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 2004/000781

Since, claims 1-5 and 9 are considered to lack an inventive step the following separate inventions are identified:

Invention I: Claims 6-8 and 17 directed to a method of measuring dose distribution and calculating correction factors for each time-interval.

Invention II: Claims 10-16 relate to detectors used in a phantom for radiation therapy where the thickness of the detectors is specified to be less than range of radiation electrons maximum energy.

INTERNATIONAL SEARCH REPORT

Information on patent family members

01/10/2004

International application No.

PCT/SE 2004/000781

US	5511107	A	23/04/1996	AU	690313	B	23/04/1998
				AU	3132695	A	04/03/1996
				CA	2195651	A	15/02/1996
				EP	0775293	A	28/05/1997
				JP	10506298	T	23/06/1998
				WO	9604527	A	15/02/1996
